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## MEMORANDUM

DATE: October 10, 2003

SUBJECT: HIMCO Responsiveness Summary

FROM: Teresa Reinig, Kathie Englert, Janie Carrig, Rick Grabowski &amp; Don Moses

TO: Gwen Massenburg

IAG: DW96947659-01 WAF (R5) -0073

The responses below document USACE's review of the PRP's Comments on *Proposed Amendments to Record of Decision, Himco Dump Superfund Site, July 2003*.

**Section III. Comments by R. Grabowski, Project Geologist****Comment Section III H, page 25, SG#1:**

EPA's response included reference to work plans written by the USACE. The correct references follow:

Work Plan for the Supplemental Field Investigation at the Himco Dump Superfund Site, Elkhart, Indiana, October 1998.

Addendum IV Field Sampling Plan, Phase 2 Soil Gas Investigation, Himco Dump Superfund Site, Elkhart, Indiana, October 1999.

**Comment Section III H, page 29, GW #6:** Bayer has commented that several (three) lines of evidence suggest that the Himco landfill is not the source of the source of the VOCs detected in certain residential wells east of the landfill. Bayer has further commented that there is "no evidence that the ground water underneath the landfill flows to the east" and that "The RI reported that ground water flow is southerly underneath the landfill...."

**EPA's Response:** EPA does not agree with this comment. The RI Report characterizes the hydrogeology and groundwater flow at two different scales, from a regional standpoint, and from a much smaller site-specific standpoint. A regional hydrologic study was performed by the USGS between 1978 and 1981, the results which were incorporated into the RI Report. This regional hydrologic study encompassed an area of approximately 120 square miles. A regional

contour map of groundwater flow in the unconfined aquifer from the USGS study was presented in the RI Report, showing flow is generally to the south towards the St. Joseph River. The USGS did not differentiate between water levels obtained from monitoring wells screened across the water table or at depth within the unconfined aquifer as was performed in the SSCR. Given the scale of the USGS investigation, this would probably not have made much difference in the interpreted ground water flow direction as presented. The RI and the SSCR present groundwater flow interpretations based on a network of monitoring wells from a much smaller area of approximately 1 square mile. Furthermore, the interpreted ground water flow directions presented in the SSCR were segregated by depth of the screen interval of the monitoring wells based on the fact that vertical gradients were noted in many of the nested monitoring well clusters. Even when comparing results from vastly different scales and monitoring networks, one can see that the site-specific results closely match those presented in the regional study for the area immediately surrounding the Himco Dump Site. All studies show that there is a south to southeast ground water flow direction around and beneath the Himco Dump Site. This implies that on a local basis (on the east side of the Himco Dump Site), there is an easterly component, albeit small, to the ground water flow direction. The EPA has never maintained that ground water flows strictly in an eastward fashion.

Furthermore, Bayer has inferred that the shape of the bromide contours may be used as an indication of ground water flow direction. A comparison of Figures 9 and 10 of the U.S. Geological Survey Water-Resources Investigations Report 91-4053, which shows the areal distributions of maximum dissolved bromide concentrations for 1980 and 1982 respectively, clearly shows dissolved bromide migrating towards the east to what is identified as an area of industrial pumping (the Bayer Corporation). This is clear evidence that an eastward component of ground water flow has existed in the vicinity of the Himco Dump Site.

✓ **Comment Section III J, ID #4:** Declines in the concentration of dissolved bromide in ground water samples demonstrate that ground water quality conditions are improving and the down-gradient impact of the Himco Landfill is diminishing naturally.

**EPA's Response:** EPA does not agree with this comment. Several potential migration pathways are present for all contaminants to migrate from the landfill to off-site locations. The primary pathways for off-site migration that were investigated in the SSCR were ground water and soil gas. The soil gas detected a large number of volatile organic compounds. The contaminants detected in the ground water tend to be many of the same ones detected in the soil gas, mainly volatile organic compounds, although metals have also been detected in the ground water.

Ground water provides the primary pathway for contaminant migration from the landfill. The fate and migration of contaminants is dependent on the interrelationship between the site-specific geological and chemical conditions, and the physical and chemical properties of the contaminant. To evaluate the potential transport and attenuation mechanisms of the contaminants emanating from the landfill in ground water, a temporal analysis of bromide levels was initially performed as described in the SSCR. One conclusion from this trend analysis is that the bromide source is still actively recharging ground water, but a gradual decrease of bromide levels may be seen in lower levels of the aquifer. Attempts were also made to evaluate the trends of organic contaminant levels, but no discernable pattern was found in the SSCR. When compared to the bromide trends, the changes in organic contaminant levels is much more sudden, indicating other potential transport and/or attenuation mechanisms are present than those mechanisms impacting the movement of the conservative bromide ion.

The EPA believes that based on all available analytical data, that contaminants continue to move vertically from the landfill, and partition between the air and water phase based on their chemical properties. Those contaminants that are soluble will move with water, those that are volatile will move in the soil gas, those that are both move in both phases. The transport/attenuation mechanisms vary based on the contaminants. Given the heterogeneous nature of the landfill and differences in transport/attenuation mechanisms between bromide, organic contaminants, and even other inorganic contaminants, it is not reasonable to use bromide concentrations alone as an indicator of ground water quality, and the use of bromide trends as an indicator of other contaminant trends is not acceptable.

### **Section III J. Comments by D. Moses, Project Geotechnical Engineer**

✓ **Comment Section III J, page 41, Table ID#12:** Bayer has comment: *EPA also produced no data or analysis in the SSCR or the 2003 Proposed Plan document to demonstrate that the compacted clay cover would not also require acquisition of residential properties to facilitate vehicle access, fencing, right-of-way requirements, and storm water management structures.*

**EPA's Response:** Real estate requirements are based upon a defined remedy and are design dependent. Until the design is completed, impacts to residential properties cannot be assessed.

**Comment Section III J, page 43, Table ID#17:** Bayer has comment: *Regarding the issue of constructing and maintaining a compacted clay barrier and soil cover over the entire footprint of the landfill, installing and operating an active gas collection and treatment system, and other measures, the 2003 Proposed Plan is arbitrary and capricious, because EPA failed to recognize that the site did not pose any unacceptable risk under a reasonable exposure and release scenario.*

*The 2003 Proposed Plan is not more protective of human health than the A No Action@ alternative and is, therefore, not cost effective.*

✓ **EPA's Response:** The aerial extent and thickness of the existing landfill cover materials varies and was not placed with according to an engineered design with specifications and quality control. The soil cover in the proposed plan is intended to prevent dermal contact with the waste. The components of the soil cover is based upon ARAR's being IDEM remedial requirements for Open Dumps.

✓ **Comment Section III J, page 43, Table ID#17:** <sup>is</sup> Bayer has comment: *Given that the composite cap will have Aminimal@ effectiveness, the proposed clay cap, which is not as thick as the composite cap and does not incorporate the internal drainage features of a composite, will have Aless-than-minimal= effectiveness and the 2003 Proposed Plan is also Anot cost effective@.*

**EPA's Response:** As stated, in the response above (17), the components of the soil cover is based upon ARAR's being IDEM closure requirements for Open Dumps. A site-specific analysis would be required to develop a cover type and thickness that could be constructed that would prevent dermal contact with the waste. Specific items that would have to be addressed include the following design related issues: Topsoil and rooting depth of cover soil that would be required to sustain vegetation. Material availability. Temporary and permanent erosion control requirements. Demarcation warning and separation barrier materials required to prevent erosion, biotic and human intrusion into the waste. Constructibility issues relating to material selection and equipment compatibility.

#### **Section V.B. Comments by J. Carrig, Project Chemist**

**Comment Section V.B. and V.B.1, page 64:** Bayer has commented: *"The revised risk assessment is based upon an incomplete and inaccurate quality assurance and data validation process.*

- 1. Certain ground water samples can not be considered representative sample, due to the lack of stabilization monitoring during well purging. The quantitative deficiencies in these samples pertain to all analytes, not just metals."*

**EPA's Response:**

Monitoring wells were purged in accordance with the work plans and standard acceptable protocol. As noted in the comment, the samples collected from the direct push locations and the residential well samples were not purged using the same criteria as the monitoring wells. The direct push probe is in direct contact with the aquifer and does not require or support the prolonged purging performed at monitoring wells. The direct push locations were purged sufficiently long enough to ensure the water collected was representative of the formation from which it was drawn.

EPA disagrees that turbidity will create a significant effect on the VOC concentrations or that there was a persistent problem with equipment decontamination. VOCs generally have a tendency to partition to water rather than have an affinity for soil, as demonstrated by the low  $K_{ow}$  values. The VOCs detected are soluble in aqueous solutions at concentrations above the

levels of concern. Additionally, the issue of turbidity impacting VOC results is immaterial because the presence of VOCs is site related, whether partitioned to the water or the soil. The results of the metals analysis was invalidated due to turbidity or lack of turbidity results because the particles suspended in a turbid sample are inherently metal. However, the presence of VOCs does not hold the potential to be due to natural background conditions in the same manner as metals which are the primary structure of the soil. The direct push equipment was thoroughly decontaminated between sample locations. Moreover, the ground water purging provided additional rinsing of the equipment. Residential well samples were collected directly into the sample containers.

The analytical result from the different residential sampling ~~episode~~ events shows very good correlation among the target analytes. Based on the inorganic data, as well as the organic data, the results were reproducible. Without providing an extraction rate, comparison of purge times is somewhat immaterial.

**Comment Section V.B.2, page 65:** Bayer has commented: *"A Rinsate blanks do not appear to have been prepared and tested daily and source water blanks do not appear to have been prepared and tested during each event."*

**EPA's Response:**

EPA agrees that the thallium sample result from WT116A in 1995 may be questionable because of the result of the rinsate sample. However, it is not valid to use the 1995 volatile organic blank contamination results from WT116A to discard the later (1996, May 2000, November 2000) detections of 1,2 dichloropropane. The (1998 and May 2000) sampling of the monitoring wells used disposable tubing, and the residential samples were collected directly to the sample containers which eliminated the requirement equipment rinsate blanks.

The quality control (QC) samples (trip blanks, source water, and equipment blanks) were collected in 2000 and are presented in the Data Quality Evaluations ~~found~~ in Appendix I. The quality control samples have been used to qualify the data presented in Appendix H.

**Comment Section V.B.3, page 67:** Bayer has commented: *"The sampling data reported in the SSCR do not consistently reflect the results from the data validation and quality assurance reviews. At a minimum, EPA should scrutinize the tables in the SSCR showing environmental sampling data, corroborate their accuracy, and assess the implications of the corrections on its conclusions regarding site-related COPCs, exposure concentrations, and site related risk measures."*

**EPA's Response:**

EPA disagrees with this comment. The deficiencies noted are generally invalid since the data described as being in error has either been compared to inappropriate tables or is where errors were noted therein, the ~~impacted~~ said tables were not used in the assessment of risk or in the development of conclusions.

The 1,2 dichloropropane result, reported in the sample collected from WT116A, that was qualified in the 1995 investigation was detected several times in later (1996, May 2000).

November 2000) sampling rounds without the qualification of results.

The purpose of the comments as they pertain to the phthalate data reported in 1995 is not clear. The data that was qualified due to blank contamination retained the "U" qualifier but at the concentration it was detected rather than changing the reported value to the quantitation limit.

As noted by Bayer, the antimony value reported from WT119A in 1998 was qualified as "not detected" because of blank contamination. The value (43.2 BJ) contained in the Appendix H table, *Historical Summary of Monitoring Wells Ground Water Detections* is an error because it is lacking the "U" qualifier. However, data from this table was not used in the risk assessment.

The iron and manganese values reported for WT112B in 1995 in the Appendix H table; "*Historical Summary of Monitoring Wells Ground Water Detections*" are also in error. However, as stated in the previous paragraph the data presented in the table; "*Historical Summary of Monitoring Wells Ground Water Detections*" was not used in the risk assessment. The values presented in the event table (Monitoring Well Ground Water Analytical Results September 1995) were used in the risk assessment.

IDEM provided an independent review of the inorganic data and prepared tables to support their validation. It is clearly noted on these tables that they should not be used as data report tables. The errors in these validation tables should not be misconstrued to represent actual values.

### **Comments by K. Englert, Project IH**

**Note. Responses to written comments in an email from Gwen Massenburg, dated Sept 29 2003.**

#### **1. Response:**

The inhalation rates of 0.6 m<sup>3</sup>/hr and 30 m<sup>3</sup>/day were obtained from RAGS Part A (EPA, 1989, Exhibit 6-16). [Reference to RAGS Part A, EPA, 1989, and input parameters obtained from RAGS Part A were appropriate at the time of the writing of the Supplemental Risk Assessment (early 1999)]. The rates were chosen to best represent the known activity related to the exposure of the individual (e.g., showering/bathing and household-use/household work) and were to represent a Reasonable Maximum Exposure (RME) (90th to 95th percentile) rather than a Central Tendency (CT) or mean value. The rates can be further justified by looking at the "activity-specific" inhalation rates (EPA, 1997). Housework is considered light activity (EPA 1997, Table 5-7) rather than sedentary (sitting or standing) as in taking a shower or bath. The values for sedentary range from children (0.4 m<sup>3</sup>/hr) to adults (0.6 m<sup>3</sup>/hr) and values for conducting housework/light activities for adult females (1.10 to 1.33 m<sup>3</sup>/hr)(EPA 1997, Tables 5-6 and 5-7). The referenced studies (Tables 5-6 and 5-7) were conducted in 1993. Other studies in the referenced guidance document (EPA, 1997) provided similar "activity-specific" inhalation rates.

#### **2. Response:**

While the volumes of water from a shower [186L (age-adjusted time of 0.31 hours and 600L/hour flow rate)] and bath (half the volume of a bathtub is approximately 135L\*\*) are comparable, the calculation of the concentration (using the Andelman model) in air must account for the additional amount of time the water is allowed to volatilize in the bath and concentrate in a constant volume. The model easily accounts for volatilization in the shower because the water flows (when volatilization occurs) the entire shower time (water flow rate and time are key parameters in the calculation of the concentration). However, in the bath, volatilization continues after the flow of water stops (i.e., splashing around in the bath). Therefore, the additional volatilization into the enclosed space is accounted for in the model by including the bath time; resulting in a higher concentration. Although the amount of water from a shower (186L) is different than that of the bath (450L) as modeled, it is due to compensating for the longer amount of time for volatilization to occur.

The Andelman model was developed for both showering and household use and there are inherent uncertainties due to the nature of models. Further uncertainty is added using professional judgement in applying the model to a bathing scenario. The uncertainty is discussed in Section 9.9 of the Supplemental Risk Assessment (EPA, 2002).

The text on page 9-16 was included to provide an overall justification for using the shower model for the bathing activity. The value of 150L is cited in a study by Prichard and Gazelle (1981) and further cited in Andelman, as the quantity of water used during a bath and shower showing that water volumes for these activities are comparable. In addition, the information in the text regarding percent volatilization was to justify using the same fraction volatilized (fs equal to 0.75) for modeling the shower and bath.

The text on pages 9-29 and 9-32 should state approximately 19 minutes (0.31 hours) rather than 30 minutes. The first reference for the exposure times on page 9-35 should be 1997b (EPA, 1997).

### **3. Response:**

The input parameters referenced to Risk Assistant are parameters built into this program. The primary source for these parameters used by Risk Assistant is Andelman, 1990.

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EPA, 1989. *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)*. Washington, D.C.: U.S. Environmental Protection Agency, Office of Emergency and Remedial Response.

EPA, 1997. U.S. Environmental Protection Agency. *Exposure Factors Handbook*, Office of Research and Development, Washington, DC, EPA/600/P-95/0021Fa, b, and c. August.

EPA, 2002. *Final Supplemental Site Investigations/Site Characterization Report, Himco Dump*

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*SuperfundSite.* December.

**\*\*Ramp Bathtub Specifications 48 inches x 21 inches (bathtub bottom) x 16 inches deep.**  
([www.foreverstainlesssteel.com](http://www.foreverstainlesssteel.com)).